

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

YAMAMUKA et al.

Application No.: Unassigned

Art Unit: Unassigned

Filed: July 6, 2001

Examiner: Unassigned

For: VAPORIZING DEVICE
FOR CVD SOURCE
MATERIALS AND CVD
APPARATUS
EMPLOYING THE SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

IN THE CLAIMS

Cancel claims 1-13 and substitute the indicated claims therefor:

14. (New) A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing introduced CVD source materials by heating, the vaporizer including a chamber for vaporization of the CVD source materials, the chamber having an inlet for introducing the CVD source materials into the chamber and a heat conductive chamber wall heated during vaporization of the CVD source materials,

a spray nozzle having an end fixedly attached to the inlet of the chamber for spraying the CVD source material into the chamber,

cooling means disposed outside the chamber and having a cooling portion coupled to the spray nozzle for cooling the spray nozzle, and

heat conduction restricting means for restricting heat conduction from the chamber wall to the spray nozzle, the heat conduction restricting means being disposed between the chamber and the end of the spray nozzle, and forming an airtight seal between the spray nozzle and the chamber wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

15. (New) A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the chamber wall, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby thermally insulating the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle; and

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall.

16. (New) The vaporizing device for vaporizing CVD source materials of Claim 15, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

17. (New) A chemical vapor deposition (CVD) apparatus comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the walls of the chamber, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby providing thermal insulation of the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle;

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall; and

a reaction chamber receiving the CVD source materials vaporized by the vaporizing device for forming a film on a substrate through reaction of the CVD source materials.

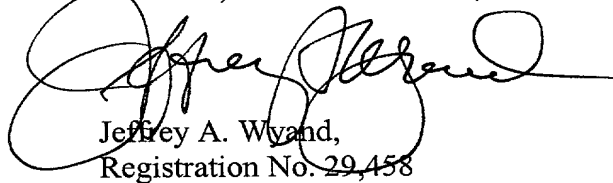
18. (New) The chemical vapor deposition (CVD) apparatus of Claim 17, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

REMARKS

The new claims further define the invention disclosed in the patent application. No new matter is added.

Respectfully submitted,

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**SPECIFICATION, CLAIMS AND
ABSTRACT AS PRELIMINARILY AMENDED**

Add the following claims:

14. (New) A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing introduced CVD source materials by heating, the vaporizer including a chamber for vaporization of the CVD source materials, the chamber having an inlet for introducing the CVD source materials into the chamber and a heat conductive chamber wall heated during vaporization of the CVD source materials,

a spray nozzle having an end fixedly attached to the inlet of the chamber for spraying the CVD source material into the chamber,

cooling means disposed outside the chamber and having a cooling portion coupled to the spray nozzle for cooling the spray nozzle, and

heat conduction restricting means for restricting heat conduction from the chamber wall to the spray nozzle, the heat conduction restricting means being disposed between the chamber and the end of the spray nozzle, and forming an airtight seal between the spray nozzle and the chamber wherein the spray nozzle includes first and second coaxial tubes, the

first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

15. (New) A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the chamber wall, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby thermally insulating the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle; and

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall.

16. (New) The vaporizing device for vaporizing CVD source materials of Claim 15, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

17. (New) A chemical vapor deposition (CVD) apparatus comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the walls of the chamber, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby providing thermal insulation of the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle;

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall; and

a reaction chamber receiving the CVD source materials vaporized by the vaporizing device for forming a film on a substrate through reaction of the CVD source materials.

18. (New) The chemical vapor deposition (CVD) apparatus of Claim 17, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

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CLAIMS PENDING AFTER PRELIMINARY AMENDMENT

14. A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing introduced CVD source materials by heating, the vaporizer including a chamber for vaporization of the CVD source materials, the chamber having an inlet for introducing the CVD source materials into the chamber and a heat conductive chamber wall heated during vaporization of the CVD source materials,

a spray nozzle having an end fixedly attached to the inlet of the chamber for spraying the CVD source material into the chamber,

cooling means disposed outside the chamber and having a cooling portion coupled to the spray nozzle for cooling the spray nozzle, and

heat conduction restricting means for restricting heat conduction from the chamber wall to the spray nozzle, the heat conduction restricting means being disposed between the chamber and the end of the spray nozzle, and forming an airtight seal between the spray nozzle and the chamber wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

15. A vaporizing device for vaporizing chemical vapor deposition (CVD) source materials comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the chamber wall, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby thermally insulating the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle; and

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall.

16. The vaporizing device for vaporizing CVD source materials of Claim 15, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of a gas containing the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.

17. A chemical vapor deposition (CVD) apparatus comprising:

a vaporizer for vaporizing CVD source materials by heating, the vaporizer including a chamber having a heat conductive chamber wall with an inlet for introducing the CVD source materials into the chamber;

a spray nozzle having a first end located to spray a CVD source material into the chamber through the inlet;

a plate having at least one portion thinner than the walls of the chamber, contacting and locating the spray nozzle relative to the inlet to spray CVD source materials into the chamber, the plate limiting thermal conduction from the chamber wall, thereby providing thermal insulation of the spray nozzle from the chamber wall;

a cooling block in contact with and surrounding the spray nozzle for conducting heat from and cooling the spray nozzle;

a heat conduction restricting region between the cooling block and the chamber wall, thermally isolating the spray nozzle and the cooling block from the chamber wall; and

a reaction chamber receiving the CVD source materials vaporized by the vaporizing device for forming a film on a substrate through reaction of the CVD source materials.

18. The chemical vapor deposition (CVD) apparatus of Claim 17, wherein the spray nozzle includes first and second coaxial tubes, the first tube for passage of the CVD source materials and the second tube for passage of a spray gas for spraying the CVD source materials into the chamber.